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Remarks/Arguments

Claims 1, 2, and 4-29 remain in the application. Claim 3 has been cancelled.

Claims 1, 20-23, 28 and 29 have been amended.

Claim Objections

Claim 23 was objected to because of an informality in respect of dependency. The Applicant thanks the Examiner for identifying the incorrect dependency of claim 23. The Applicant has amended claim 23 to provide the correct dependency from claim 1.

Claim 27 was objected to on the basis of lacking proper antecedent basis. The Applicant thanks the Examiner for their diligent review and accordingly has amended claim 27 to be dependent upon claim 26.

Claim Rejections – 35 USC 102

Claims 1-15, 17-18, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al (US Patent Publication 2001/0012149), hereinafter referred to as Lin.

Referring to Lin there is taught the application of photonic crystals to a variety of optical devices including a prism (Lin figure 6a), the photonic crystals comprising a regular array of high refractive index dielectric elements embedded within a medium of lower refractive index. Accordingly, the refractive index of the prism taught by Lin varies periodically in any direction with a periodicity determined by the spacing of the high dielectric index elements, be they rods or spheres.

Amended claim 1 recites regions that are "continuous between the first surface and second surface of the stratified body, the material within each region being both uniform in index of refraction, absent any periodic variation in index of refraction within the region, and having a different index of refraction to the materials in adjacent regions."

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Accordingly Lin does not teach that each of the regions is continuous between the first and second surfaces. In fact, a plurality of discrete high dielectric index elements are embedded within a material of lower dielectric index. The teachings of Lin are to materials with a periodic variation in refractive index between the first and second surfaces, unlike the claimed invention, which is directed to regions of uniform index of refraction. The embedded elements of the teaching of Lin are either two-dimensional, in the case of dielectric rods or similar structures, or three-dimensional, in the case of spheres or similar structures. Furthermore, it would not have been obvious to one skilled in the art to take the two- and three-dimensional photonic crystals of Lin with high index of refraction elements embedded within a medium of lower index of refraction and modify same to result in the present invention as claimed in the claims as amended.

Applicant respectfully traverses the present rejections in respect of independent claim 1.

In respect of dependent claims 2, 4-15 and 17-18 the Applicant traverses the rejections on the grounds that these claims are dependent upon independent claim 1 and therefore are also allowable.

Claim 4 recites "each of the regions has a first free end and a second free end; the first free ends of the plurality of regions collectively define the light receiving surface; the second free ends of the plurality of regions define the light exiting surface." The teachings of Lin as interpreted by the Examiner is that the plurality of high dielectric constant elements form one group of regions and the low dielectric constant medium within which these are embedded forms a second group of regions. Clearly, such an interpretation does not provide for the first free ends of the first group of regions to define the first surface and the second free ends of the same group to define the second region. Accordingly, Applicant further traverses the rejection on the grounds that Lin does not teach the required structure of the regions, as defined in claim 4.

Now referring to dependent claim 7, Lin teaches a structure of a plurality of discrete high dielectric constant elements embedded within a medium of low dielectric constant. Lin teaches that the medium of low dielectric constant being air in one embodiment, such that

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the plurality of regions formed of the solid material cannot form the first and second surfaces as recited by the Applicant. Accordingly, Applicant further traverses the rejections on these grounds.

Referring to independent claim 28, as noted supra in respect of claim 1 Lin does not teach to a structure of layers of uniform index of refraction placed adjacent to each other, rather Lin teaches to a prism having two- or three-dimensional variations in refractive index, these variations arising from high dielectric constant structures embedded within a material of lower dielectric constant. Lin does not teach to uniform layers. As such Applicant traverses the rejection.

Now referring to independent claim 29, as with the comments presented supra in respect of claims 1 and 28 Applicant traverses the rejection on the grounds that Lin does not teach the claimed invention. Lin does not teach to regions of material having uniform index of refraction, the regions extending from a first surface to a second surface, rather Lin teaches in respect of materials having highly periodic variations in composition and material properties.

Claims 1, 4-6, 11-12, 14-15, 19-20, 22-25 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Kittaka et al (European Patent Publication EP 1 363 145) hereinafter referred to as Kittaka.

The teachings of Kittaka relate to the provisioning of a compact wavelength multiplexer / demultiplexer employing 1-dimensional photonic crystals, these 1-dimensional photonic crystals being disposed in a vertical structure, each layer having an identical cross section, to form an optical waveguide structure. As taught by Kittaka therefore the regions of the structure are not of differing lengths. Accordingly Applicant traverses the rejection in respect of independent claim 1 on the grounds that Kittaka does not teach all elements of claim 1 as amended.

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Now referring to dependent claims 4-6, 11-12, 14-15, 19-20, and 22-25 Applicant traverses the rejections on the grounds that the claims are dependent upon independent claim 1 and are therefore dependent upon allowable subject matter.

Referring to independent claim 29, Applicant notes the comments made supra in respect of claim 1 also apply here in that Kittaka does not teach to a stratified body comprised of a series of layers of uniform refractive index absent periodic variations in refractive index extending between the first and second surfaces and having different lengths. Accordingly Applicant traverses the rejection raised in respect of independent claim 29 on the same grounds as those supra in respect of claim 1.

> *Claims 1 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al (Optics Letters, Vol. 21, No. 21, pp 1771-1772, November 1, 1996), hereinafter referred to as Lin 1996.*

Applicant notes that Lin 1996 teaches the same photonic crystal structure as taught by Lin supra in respect of other 35 U.S.C. 102(b) rejections. Amended claim 1 specifies "at least a plurality of regions of optically permissive material disposed adjacent one another in a layered relationship and being continuous between the first surface and second surface of the stratified body, the material within each region being both uniform in index of refraction, absent any periodic variation in index of refraction within the region, and having a different index of refraction to the materials in adjacent regions." Lin does not teach that each of the regions are continuous between the first and second surfaces, in fact as taught there a plurality of discrete high dielectric index elements embedded within a material of lower dielectric index. The teachings of Lin are to materials with a periodic variation in refractive index between the first and second surfaces, unlike the invention as claimed which is directed to regions of uniform index of refraction. Accordingly, Applicant traverses the rejection raised in respect of independent claim 1 as presented supra in that the teachings of Lin do not teach to the design of a wavelength multiplexer / demultiplexer being formed by a stratified body of regions of uniform index of refraction which are adjacent one another forming the stratified body.

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Referring to dependent claim 16 Applicant notes that this is dependent upon independent claim 1 and as such is dependent upon allowable subject matter.

Claim Rejections – 35 USC 103

Claims 21 and 26-27 are rejected under 35 U.S.C. 103(a) as being obvious in light of Kittaka et al (European Patent Publication EP 1 363 145) hereinafter referred to as Kittaka.

Referring to dependent claim 21 Applicant notes that the claim is dependent upon the allowable subject matter of independent claim 1. As such Applicant traverses the rejection raised in respect of Kittaka.

Referring to independent claim 26 and claim 27 depending therefrom, Applicant notes that claim 21 is believed to be allowable and, as such, claim 26 incorporating the limitations of claim 21 is also believed to be allowable.

The application is now believed to be in proper condition for allowance. Applicant looks forward to receiving favorable reconsideration of the present application.

Please charge any additional fees required or credit any overpayment to Deposit Account No: 50-1142.

Respectfully submitted,

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